

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 1. (Amended) A semiconductor product comprising a barrier layer
2 disposed between a copper-containing structure and a low-k dielectric film, said
3 barrier layer comprising a composite film structure including a nitrogen-
4 containing, substantially oxygen-free first film forming a boundary with said
5 copper-containing structure and an oxygen-containing, substantially nitrogen-free
6 second film forming a boundary with said low-k dielectric film in which said first
7 film comprises nitrogen-doped silicon carbide and said second film comprises
8 oxygen-doped silicon carbide.

1 2. (Cancelled)

1 3. (Cancelled)

1 4. (Previously presented) The semiconductor product as in claim 1, in
2 which said copper-containing structure comprises a surface including a copper
3 wire formed within an insulating material.

1 5. (Previously presented) The semiconductor product as in claim 1, in
2 which said barrier layer is formed on said copper-containing structure and said
3 low-k dielectric film is formed on said barrier layer.

1 6. (Previously presented) The semiconductor product as in claim 5,
2 further comprising an oxygen doped silicon carbide film formed over said low-k
3 dielectric film, a further low k dielectric film formed over said oxygen-doped
4 silicon carbide film and an oxygen-doped silicon carbide hardmask formed over
5 said further low-k dielectric film.

1 7. (Previously presented) The semiconductor product as in claim 6, in
2 which said semiconductor product includes a two-tiered opening extending down
3 from a top surface of said oxygen-doped silicon carbide hardmask, said two-
4 tiered opening including a wider upper portion extending through said oxygen-
5 doped silicon carbide hardmask, said further low-k dielectric film, and said
6 oxygen doped silicon carbide film, and a lower, narrower portion extending
7 through said low-k dielectric film, said second film, and said first film.

1 8. (Previously presented) The semiconductor product as in claim 1,
2 wherein said low-k dielectric film is formed of SiOC-H.

1 9. (Previously presented) The semiconductor product as in claim 1,
2 wherein said low-k dielectric film has a dielectric constant less than 3.5.

1 10. (Amended) A semiconductor product comprising a barrier layer
2 disposed between a readily-oxidizable conductive material and a low-k dielectric
3 film, said barrier layer comprising a composite film structure including a nitrogen-
4 containing, substantially oxygen-free first film forming a boundary with said
5 conductive material and an oxygen-containing, substantially nitrogen-free second
6 film forming a boundary with said low-k dielectric film, each of said first film and
7 said second film formed of silicon carbide.

1 11. (Previously presented) A semiconductor product comprising a film
2 stack including:

3 a lower low-k dielectric film;

4 an etch-stop layer formed over said low-k dielectric film;

5 an upper low-k dielectric film formed over said etch-stop layer; and

6 a hardmask layer formed over said upper low-k dielectric film, each of said
7 etch-stop layer and said hardmask layer formed of oxygen-doped silicon carbide.

1 12. (Previously presented) The semiconductor product as in claim 11,
2 in which said film stack includes a two-tiered opening formed therein, said two-
3 tiered opening including a wider upper portion disposed over a narrower lower
4 portion,

5 said narrower lower portion extending through said lower low-k dielectric
6 film,

7 said wider upper portion extending through said etch-stop layer, said
8 upper low-k dielectric film and said hardmask layer, and

9 said two-tiered opening filled with a conductive material.

1 13. (Previously presented) The semiconductor product as in claim 12,
2 further comprising a composite film structure formed beneath said lower low-k
3 dielectric film and including a nitrogen-doped silicon carbide film formed beneath
4 an oxygen-doped silicon carbide film, and wherein said narrower lower portion
5 further extends through said composite film structure and said two-tiered opening
6 extends to a bottom surface formed of a further conductive material.

1 14. (Previously presented) The semiconductor product as in claim 13,
2 wherein said further conductive material comprises copper.

1 15. (Previously presented) A semiconductor product comprising a film
2 stack including:

3 a copper-containing surface;

4 a nitrogen-containing first barrier layer disposed over said copper-
5 containing surface;

6 an oxygen-doped, substantially nitrogen-free second barrier layer
7 disposed over said first barrier layer;

8 a first low-k dielectric film disposed on said second barrier layer;

9 an oxygen-doped silicon carbide etch-stop layer disposed over said first
10 low-k dielectric film;
11 a second low-k dielectric film disposed over said etch-stop layer; and
12 an oxygen-doped silicon carbide hardmask film disposed over said second
13 low-k dielectric film.